Rubiacearum Americanarum Magna Hama Pars XI. A New Species of *Alseis* (Calycophylleae) from Central America and Notes on the Morphology of this Neotropical Genus

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ABSTRACT. The Neotropical tree genus *Alseis* is unusual in the Rubiaceae in having a typically deciduous habit and protogynous flowers that are produced just before or with the new leaves. *Alseis costaricensis* C. M. Taylor shares characteristics with both *A. hondurensis* Standley and *A. blackiana* Hemsley of Panama and adjacent Colombia, but is allopatric to and differs morphologically from both of these species.

Key words: *Alseis*, Calycophylleae, neotropics, Rubiaceae.

The genus *Alseis* Schott includes about 15 species of Neotropical trees found in lowland wet, seasonal, and dry forests and also in savanna habitats from southern Mexico to southern Brazil. *Alseis* is distinguished by its spiciform inflorescences; its relatively short corollas with the reduced lobes narrowly imbricate or sometimes apparently open in bud; its densely pubescent stamen filaments; its numerous ovules on pendulous placentas that are attached to the apical part of the septum; its narrow capsular fruits; and its flattened winged seeds (Andersson, 1994). *Alseis* was long classified in the tribe Cinchoneae (e.g., Steyermark, 1974; Robbrecht, 1988), but careful study by Andersson and Persson (1991) showed that this tribe was rather heterogeneous. Consequently they as well as later authors (e.g., Robbrecht, 1993) classified *Alseis* in the tribe Calycophylleae L. Andersson & Persson, which comprises several genera of Neotropical trees.

Alseis is well circumscribed as a genus but not well documented by most authors, and is poorly understood at the species level. Several features of *Alseis* that are unusual in the Rubiaceae have been documented repeatedly and independently by recent collectors, notably its usually deciduous habit and its protogynous flowers. Below I discuss these unusual features and describe a new species that was discovered during preparation of the Rubiaceae treatment for the *Flora Mesoamericana*.

Alseis trees are typically relatively large in both height and diameter, and often reach the subcanopy or canopy of the forest. Some specimen labels report heights up to 35 m, although most describe the trees as 15–20 m tall. Collection of fertile specimens from trees this size is often difficult, and *Alseis* is unsurprisingly represented by relatively few specimens from most regions. Additionally, many species of *Alseis* are reported by specimen labels and field observations to be at least facultatively deciduous and to produce their flowers usually just before or with the flushing of the new leaves (A. Jardim, pers. comm.; Andersson, 1994), an uncommon habit among Neotropical Rubiaceae. Thus, flowers of *Alseis* are nearly always collected separately from the leaves and fruits, so correlating these structures is difficult. And, the stipules of *Alseis* are usually quickly caducous as the new leaves flush, so they cannot be used to help correlate flowering and fruiting collections as can be done with many Rubiaceae.

The floral biology of *Alseis* is also unusual in being protogynous (Andersson, 1994; Burger & Taylor, 1993). This condition is found in several other Neotropical genera of Rubiaceae (e.g., *Warszewiczia* Klotzsch, *Simira* Aublet), but the flowers of *Alseis* show more marked developmental differences than in other genera, in particular in corolla size and form. Typically the corollas of *Alseis* are tubular and apparently pale green in the first, pistillate stage (Fig. 1B), but then they elongate, widen, and become white and campanulate in the second, staminate phase (Fig. 1D). The corolla in the staminate phase may be two to three times as large as it was in the pistillate phase, and the pubescent filaments that enlarge in the staminate phase produce the appearance of a densely barbate corolla throat in this phase. This complicated floral biology has also contributed to the poor taxonomic knowledge of the genus, because species descriptions frequently do not specify which stage of the corolla is being described. Clearly comparisons of corollas in different stages are not useful for species distinctions.

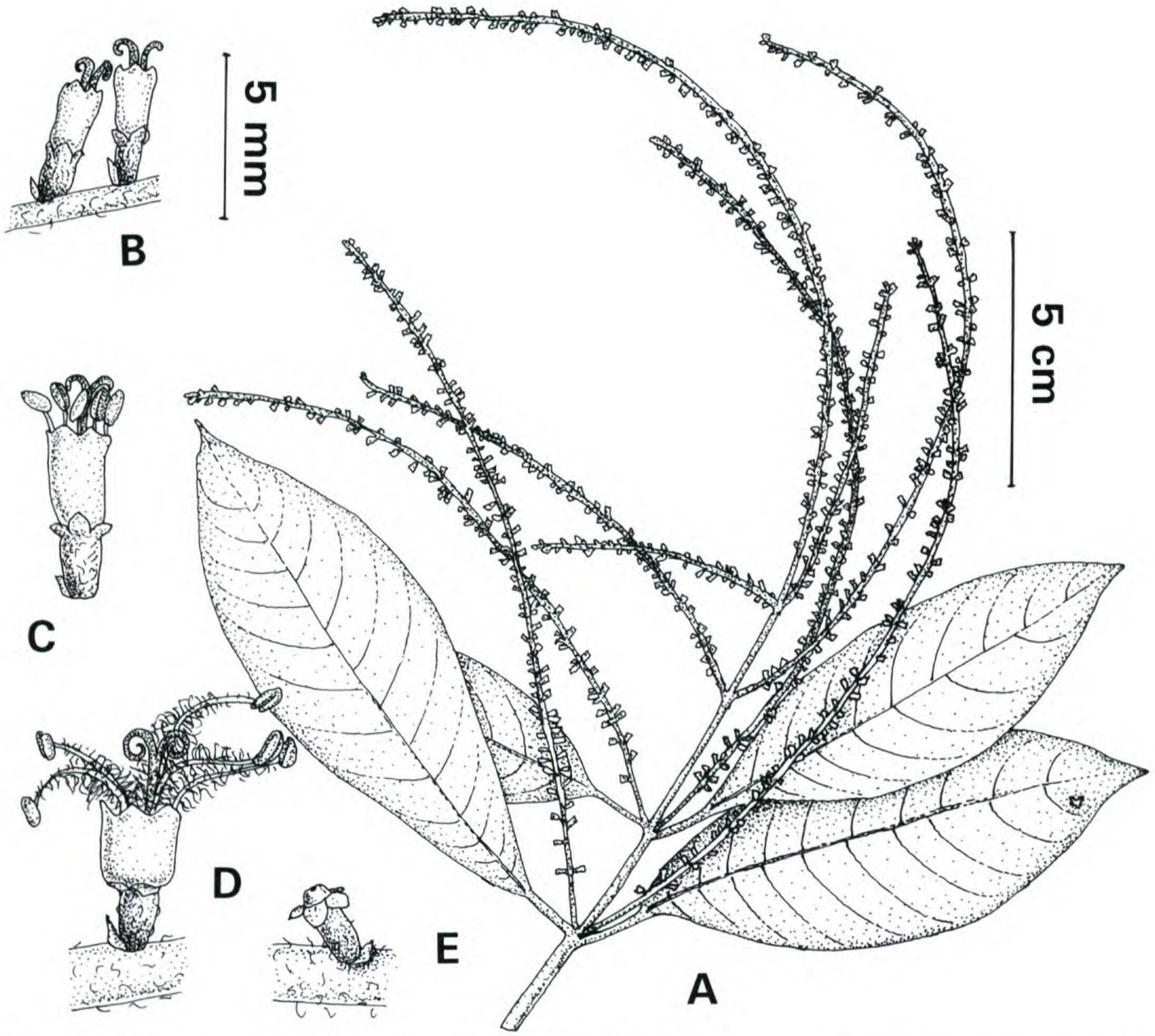

Figure 1. *Alseis costaricensis* C. M. Taylor. —A. Stem with old inflorescences (corollas fallen). —B. Detail of inflorescence showing two flowers in pistillate stage. —C. One flower between the pistillate stage and anthesis. —D. Detail of inflorescence showing one flower at anthesis. —E. Detail of inflorescence showing one old flower, after the corolla has fallen. A, based on *Jiménez et al. 670*, to 5-cm scale; B, C, D, E, all based on *Aguilar 927*, to 5-mm scale.

The capsules of *Alseis* species are all quite similar, about 1–2 cm long, relatively narrow (1–5 mm wide), widest at the top (obconic, obovoid, turbinate, clavate), chartaceous to woody, septicidal from the apex, and two-valved (Steyermark, 1974: 162, fig. 20). After dehiscence the capsule valves typically remain attached to the old infructescence axes for some time. The orientation of the capsules and the old valves, ascending versus reflexed, has been considered useful to distinguish among species (e.g., Standley & Williams, 1975) but actually seems to be quite variable. For example, all orientations from strongly ascending to completely reflexed are found among the specimens of *A. blackiana* Hemsley from Barro Colorado Island, a relatively small site. The individual capsule valves sometimes show a partial secondary splitting from the top, but this feature is variable and apparently not taxonomically significant.

Alseis costaricensis C. M. Taylor, sp. nov. TYPE: Costa Rica. Puntarenas: Reserva Forestal Golfo Dulce, Aguabuena, sector cuenca Norte, 8°42′N, 83°32′W, 50–150 m, 13 Feb. 1992, *R. Aguilar 927* (holotype, CR; isotypes, F-2142377, MO-4362115). Figure 1.

Haec species *Alseidi blackianae* Hemsley et *A. hondurensi* Standley similis, sed a hac lobulis calycinis brevioribus (0.5–1 mm longis) atque floribus sessilibus, ab illa inflorescentiis terminalibus axillaribusque plerumque ramosis distinguitur.

Trees to 30 m tall, deciduous; young twigs strigillose to glabrescent. *Leaves* oblanceolate to obovate, 7–22 × 3.5–9.5 cm, at apex acute to some-

what acuminate, at base acute, papyraceous, above and below sparsely strigillose rapidly becoming glabrescent except persistently puberulous to strigillose on costa and secondary veins; secondary veins 10 to 19 pairs, weakly looping to interconnect near margins, abaxially with hirtellous to pilosulous domatia in axils, adaxially costa, secondary veins, and higher-order venation prominulous, abaxially costa prominulous to prominent and secondary veins and higher order venation prominulous; petioles 10–25 mm long, puberulous to glabrescent; *stipules* 5–6 mm long, narrowly triangular, acute to acuminate. *Inflorescences* terminal and also in axils of uppermost leaves, produced immediately before new leaves, 15–25 × 10–20 cm, branched; secondary axes 1 to 2 pairs, densely strigillose to tomentellous, with trichomes generally appressed; peduncles 1–2 cm long; bracts narrowly triangular to linear, 0.8–1.5 mm long, acute. *Flowers* sessile, protogynous; hypanthium 1–1.5 mm long, densely tomentellous to strigillose; calyx limb divided nearly to base, lobes 5, 0.5–1 mm long, lanceolate to ovate; corolla in staminate phase campanulate, white to cream, 2–2.5 mm long, externally glabrous except often shortly puberulous near base, internally glabrous, lobes 5, reduced (i.e., 0.2–0.3 mm long), rounded, in bud narrowly imbricate to apparently open; anthers ca. 1 mm long, in staminate phase exserted, filaments 5–7 mm long, glabrescent in upper third and densely villous below; mature stigmas 2–2.5 mm long in pistillate phase, in staminate phase becoming twisted. *Capsules* narrowly turbinate, 9–12 × 1–1.5 mm, chartaceous to somewhat woody, brown, glabrescent; seeds linear-fusiform, 5–8 × 0.5–0.8 mm, papery.

Habitat, distribution, and phenology. Seasonal forests at 50–700 m in south-central Costa Rica; collected in flower in February, March, and June, in fruit in May, July, and September.

This species was treated by Burger and Taylor (1993) as "*Alseis* sp. aff. *A. hondurensis* Standl.," but with further study of this genus in Central America, its status is now clearer. *Alseis costaricensis* has been previously confused with both *A. hondurensis* Standley and *A. blackiana*. *Alseis blackiana* is found in central Panama and adjacent northwestern Colombia, and is quite similar to this new species in its floral morphology and also apparently in producing its flowers before its new leaves. However, *A. blackiana* differs from *A. costaricensis* in having unbranched, usually axillary inflorescences. *Alseis hondurensis* is found from southern Mexico through Honduras and is similar to *A. costaricensis* in having branched terminal inflorescences. However, *A. hondurensis* differs from *A. costaricensis* in its longer calyx lobes 1–2.5 mm long, and apparently in producing its flowers after the new leaves have flushed. These three species all appear to be allopatric, with *A. costaricensis* occupying a range between but isolated from the other two. The intermediate morphology of *A. costaricensis*, which shares some features with each of these other species, together with its intermediate range suggest the possibilities that it may be of hybrid origin, or that these three species are not completely isolated, or that these three species may have arisen from a formerly continuous population, perhaps with some clinal variation. At present, none of these possibilities can be excluded.

Paratypes. COSTA RICA. **Alajuela:** San Carlos, *Haber et al. 1804* (MO), *Haber et al. 1825* (F, MO). **Guanacaste:** Parque Nacional Guanacaste, Estación Pitilla, Sendero El Mismo, Finca La Pasmompa, *P. Ríos 229* (CR, MO sterile). **Puntarenas:** Drake-Osa, 3 km al E de Bahía de Drake, camino a Agujitas, *Q. Jiménez et al. 670* (CR, F, MO); cantón de Garabito, Reserva Biológica Carara, cuenca del Río Grande de Tárcoles, camino a Coopecarara, *Q. Jiménez et al. 1366* (CR, F, MO); cantón de Osa, Rancho Quemado, sector norte, camino a Estero Guerra, *J. Marín 412* (CR, F, MO); cantón de Garabito, Reserva Biológica Carara, cuenca del Río Grande de Tárcoles, Estación Quebrada Bonita, *E. Rojas 50* (CR, MO); cantón de Osa, Península de Osa, Aguas Buenas Norte, Sendero Los Guapinoles, *Zamora et al. 1891* (CR, MO sterile); Reserva Biológica Carara, Sector Quebrada Bonita, Sitio Quebrada Bonita, *R. Zúñiga 252* (CR, F, MO). **San José:** Carara National Park, Río Carara near Carara Guard Post, *Gentry et al. 79559* (CR, MO sterile); Reserva Forestal El Cangrejo Mastatal de Puriscal, along road between Puriscal and Quepos, forest patches along Río Negro at base of Cerro El Cangrejo, *Hammel et al. 17120* (CR, F, MO).

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